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PROBLEMS FOR SOLUTION.

ALGEBRA.

289. Proposed by S. A. COREY, Hiteman, Iowa.

Prove that

$$\left(\frac{n+1}{(n+1)^2-1}+\tfrac{1}{3}.\frac{n+3}{(n+3)^1-1}+\tfrac{1}{5}.\frac{n+5}{(n+5)^2-1}+\dots\right)+\left(\tfrac{2}{3}.\frac{1}{n+2}+\tfrac{4}{15}.\frac{1}{n+4}+\tfrac{6}{35}.\frac{1}{n+6}+\dots\right)=\frac{n-1}{(n-1)^2-1}+\tfrac{1}{3}.\frac{n-3}{(n-3)^2-1}+\tfrac{1}{5}.\frac{n-5}{(n-5)^2-1}+\dots+\frac{1}{l}.\frac{n-l}{(n-l)^2-1},$$

n being any odd integer greater than 1 and $l=n-2$.

290. Proposed by G. I. HOPKINS, M. A., Manchester, New Hampshire.

A and B are 45 miles apart and travel towards each other. A goes one mile the first day, three miles the second day, five miles the third day, and so on. B goes two miles the first day, four the second, six the third, and so on. In how many days will they meet? What interpretation is to be placed upon the negative value of n?

GEOMETRY.

221. Proposed by J. O. MAHONEY, B. E., M. Sc., Central High School, Dallas, Texas.

ABC is an isosceles triangle. Through any point P in its plane draw a line $PSRT$ cutting the sides AC, CB, AB in the points S, R, and T, respectively (R between B and C), so that the segments CS and BT shall be equal.

222. Proposed by FRANK LOXLEY GRIFFIN, S. M., Ph. D., Instructor in Mathematics, Williams College.

Find all surfaces such that the normal lengths intercepted by the three coordinate planes are in constant ratios for all points.

223. Proposed by W. J. GREENSTREET, Marling School, Stroud, England.

S, S' are the foci of two co-vertical parabolas A and B, the axes of which are at right angles. Draw the circle K on SS' as diameter. K is cut in D and E by a straight line parallel to the axis of A such that S' lies midway between it and that axis. Show that the lines $S'D$, $S'E$ are parallel to the two tangents to A which are normals to B.

CALCULUS.

245. Proposed by FRANCIS RUST, C. E., Allegheny, Pa.

Prove or disprove:

$$\int_0^\infty \frac{dx}{\sqrt{(x^2-1)(k^2x^2-1)}}=2F^I(k)+\sqrt{(-1)}.F^I[\sqrt{(1-k^2)}],$$

Legendre's notation, $0<k<1$.